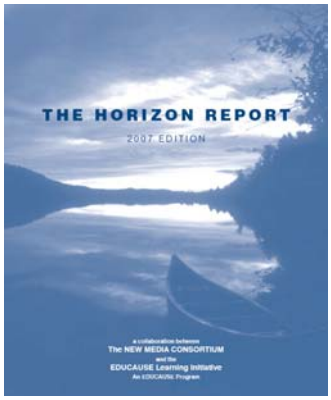

The Horizon Project

Call to Scholarship — 2007-8

The annual *Horizon Report*, a collaboration between the New Media Consortium (NMC) and the EDUCAUSE Learning Initiative (ELI), highlights six technologies that the underlying research suggests will become very important to higher education over the next one to five years. The research-based effort seeks to identify and describe emerging technologies likely to have a large impact on teaching, learning, or creative expression within higher education. The *2007 Horizon Report* was the fourth edition in this annual series.

Over the backdrop of a discussion of related trends and challenges, the *Report* described six areas of emerging technology that will impact higher education within three adoption horizons over the next one to five years. To identify these areas, the project drew on an ongoing conversation among knowledgeable persons in the fields of business, industry, and education; on published resources, current research and practice; and on the expertise of the NMC and ELI communities. The Horizon Project's Advisory Board, a international group of scholars and technologists that serve rotating terms, surveys the field to identify significant trends and challenges in higher education, investigates possible topics for the *Report*, and ultimately directs the selection of the six topics that appear each year.

The focus of the umbrella to this work, the NMC's Horizon Project, centers on the applications of emerging technologies to teaching, learning, and creative expression, and the format of the *Horizon Report* reflects that focus. Each topic includes an overview to familiarize readers with the concept or technology at hand, a discussion of the particular relevance of the topic to those activities, and examples of how the technology is being or could be applied. Each description is followed by an annotated list of additional examples and readings which expand on the discussion in the *Report*.

With the release of the fourth edition in this annual series, the NMC has undertaken for the first time a concerted, international effort to describe a research agenda and call to scholarship based on the six practices and technologies featured in the 2007 edition of the *Horizon Report*. The community was invited to participate in this process, contribute to the discussion, and help shape directions for future research in these topics across higher education.

This effort reflects and embodies the topic of new scholarship, featured in the 2007 *Report* and also the subject of a major NMC focus area initiative. This *Call to Scholarship* is designed to encourage a deeper level of understanding around each of the topics in the *Horizon Report*. To develop the call and the recommendations it contains, the NMC collected responses from hundreds of faculty, staff and administrators to the following three questions for each of the six *Horizon Report* topics:

1. What are the missing pieces for this technology or practice to be implemented in higher education?
2. What kind of research would you like to see around this topic?
3. What are some of the learning implications of this topic?

The effort was launched at the ELI Annual Meeting in January, 2007, where some 200 attendees considered the questions above for each of the topics in the *Report*. Throughout the spring and early summer, as campuses hosted faculty or staff workshops based on the Horizon Report, participants were invited to consider these questions and share their responses. NMC collected all of these responses on the project wiki at www.nmc.org/horizon/wiki/Research_Agenda, where they may still be seen.

The recommendations for scholarly work that you see in the following pages were informed by an in-depth review and synthesis of the comments on the project wiki. Recommendations for research, demonstration projects, policy formulation, tools, and technology support systems have been distilled

for each topic. The summary descriptions of the technologies and practices in the following six topic areas were drawn from the *2007 Horizon Report*; for additional information, links to demonstration projects, and suggestions for further reading, please download a copy of the *Report* from horizon.nmc.org.

The recommendations presented here are not a complete listing, but rather a starting place for continued dialog and reflection around the six topics in the *2007 Horizon Report*, and an acknowledgement that much work remains to be done before many of these are really ready for mainstream use. We encourage further comment on the Horizon Project wiki.

The intention is that the model for the process that was established this year will be refined over time, so that the questions that arise from close consideration of the *Report* can be captured, shared, and researched, continuing the work that begins with the release of the *Report* itself. This *Call to Scholarship* is also a call to action, and it is our hope that it will generate a cascade of activities across the academy. The NMC is deeply interested in such activities and hopes to see new demonstration projects, papers, and presentations at conferences around these ideas.

User-Created Content

Time-to-Adoption Horizon: One Year or Less

From classifying and tagging to creating and uploading, today's "audience" is very much in control of the content we find online. This active audience is finding new ways to contribute, communicate, and collaborate, using a variety of small and easy tools that put the power to develop and catalog the Internet into the hands of the people. The largest and fastest growing websites on the Internet are all making use of this approach, which is redefining how we think about the web and how it might be applied to learning.

A little group of Web 2.0 technologies—tagging and folksonomic tools, social bookmarking sites, and sites that make it easy to contribute ideas and content—is placing the power of media creation and distribution firmly into the hands of "the people formerly known as the audience."[1] No longer satisfied to be consumers of content, today's audience creates content as well. Producing, commenting, and classifying are just as important as the more passive tasks of searching, reading, watching, and listening.

Pervasive use of these tools is already in evidence among students, and this will only grow in the coming months. The social aspects of these audience-centered technologies, firmly established as powerful tools for creative expression, offer great potential to build community in the context of teaching and learning as well. Nonetheless, we face a significant challenge as we seek to marshal these techniques in the service of education, as this aspect of the new web turns the traditional view of what a website should be on its head.

Recommendations for Research

- How do the issues of authority, expertise, and credibility play out in the context of user-created content?
- What is the lexicon or syntax related to user-created content?
- Does the transparency of the technology make a difference in the quality or quantity of content created by users?
- Are gaps in computer literacy a barrier for some students or faculty?

[1] Rosen, Jay. (2006). "The People Formerly Known as the Audience." *PressThink*, June 27, 2006. Retrieved from journalism.nyu.edu/pubzone/weblogs/pressthink/2006/06/27/ppl_frmr.html

Recommendations for Demonstration Projects

- Explorations of the ways user-created content can be applied to scholarship and of the ways students can develop a sense of themselves as scholars.
- Discipline-based projects that illustrate how user-created content might be integrated into various applications of learning, and the contexts in which it is most useful.
- Demonstrations of learning approaches facilitated by user-created content, such as peer-to-peer learning; constructivist learning; student ownership of the learning process; or other approaches.
- Explorations of evaluation methods that could be viable to use with user-generated content.

Policy Considerations

- How might policy foster a change in institutional attitudes toward using and creating these resources for academic work (for both faculty and students)?
- What are the policy implications of allowing user content? Considerations might include intellectual property rights and copyright issues.

Needed Tools or Features

- Ways to certify or authenticate that users are who they say they are and to establish the credibility of a source.
- Tools to find and evaluate resources that users may want to incorporate.
- Citation or other tools to lead back to original sources of content when repurposing occurs.

Social Networking

Time-to-Adoption Horizon: One Year or Less

The expectation that a website will remember the user is well established. Social networking takes this several steps further; the website knows who the user's friends are, and may also know people that the user would like to meet or things the user would like to do. Undoubtedly the most pervasive aspect of Web 2.0, social networking is all about making connections and bringing people together. Conversations that take place in social networking contexts are inherently social, and often revolve around shared activities and interests. The heart of social networking is fostering the kinds of deep connections that occur when common pursuits are shared and discussed.

Even beyond that, social networking sites facilitate introduction and communication by providing a space for people to connect around a topic of common interest. These sites are fundamentally about community—communities of practice as well as social communities.

Social networking is already second nature to many students. Social networking sites not only attract people but also hold their attention, impel them to contribute, and bring them back time and again—all desirable qualities for educational materials. The challenge for educators is to leverage the power of social networking; the promise is that these tools will make building communities around learning far easier.

Recommendations for Research

- What are the essential characteristics of an effective social networking tool?
- Does the collaborative nature of social networking tools facilitate group work and constructive learning?
- Do social networking tools improve online interaction?
- Are gaps in computer literacy a barrier for some students or faculty?
- What is the lexicon or syntax related to social networking?

Recommendations for Demonstration Projects

- Applications in practice that illustrate uses of social networking tools across the disciplines.
- Models of how social networking tools can be used effectively in learning environments.
- Projects that explore how work accomplished by using social networking tools can be assessed.

Policy Considerations

- Given that many students use social networking spaces in their social lives, what issues arise around academic life and evaluation of work intruding in those areas?
- What are the privacy implications of using online identities in an academic setting?

Needed Tools or Features

- Bridges between academic and social uses of social networking technologies.
- The ability to create closed networks.
- Ways to safeguard privacy.

Mobile Phones

Time-to-Adoption Horizon: Two to Three Years

The convergence of ubiquitous broadband, portable devices, and tiny computers has changed our concept of what a phone is meant to be. With over 225 million mobile phones manufactured each year worldwide, innovation in these devices is occurring at an unprecedented pace. A pocket-sized connection to the digital world, the mobile phone keeps us in touch with our families, friends, and colleagues by more than just voice.

Our phones are address books, file storage devices, cameras, video recorders, wayfinders, and hand-held portals to the Internet—and they don't stop there. The ubiquity of mobile phones, combined with their many capabilities, makes them an ideal platform for educational content and activities. We are only just beginning to take advantage of the possibilities they offer.

Virtually every phone now sold includes some form of multimedia, if not several, as well as instant messaging, web browsing, and email. QWERTY keypads are common, and geolocation and the capability to record video and audio are quickly becoming standard features as well. New genres of filmmaking and photography are developing as artists and students experiment with equipment that fits in their pockets. The mass amateurization of video production is resulting in a new kind of video where the message is much more important than the form.

Recommendations for Research

- Under what circumstances are educators likely to accept the use of phones as learning tools?
- Are phones a viable medium for multimedia – audio, video, the web?
- What, if any, is the instructional advantage to using mobile phones for learning?

Recommendations for Demonstration Projects

- Projects that push content to phones, using them as a delivery platform.
- Model curricula that incorporate interactive educational content for phones.
- Demonstrations of learning activities or other education-related purposes in which students use their phones.
- Demonstrations of how portable multimedia, photo and video capture, location awareness, web access, and messaging can be used for student projects across the range of disciplines.

Policy Considerations

- Are there privacy implications to consider?
- How can access to mobile phones with consistent capabilities be ensured?
- What are recommended standards for interoperability between devices?
- What constitutes appropriate use of the technology? For example, in-room use of phones is an area that needs to be examined carefully.
- Do educational institutions have a role in supporting mobile phones in use by their community?
- Are there security issues related to delivering educational content on phones?

Needed Tools or Features

- Infrastructure on campuses that ensures cell signals are receivable across the campus.
- An easy way to format content for delivery on phone-sized screens.
- Technologies to support integration of mobile devices with Web 2.0 APIs (application programming interfaces) like those used to interact with Google, social networking tools, and other applications.

Virtual Worlds

Time-to-Adoption Horizon: Two to Three Years

Virtual worlds are richly immersive and highly scalable 3D environments, often deployed across a grid-based network. People enter these worlds via an avatar which is their representation in that space, moving their avatar through the space as if they were physically walking—or in some cases, flying. The most popular virtual worlds are multi-user spaces, meaning that many people can be in the same virtual space and interact with one another in real time. While many popular games take place in virtual worlds, virtual worlds are not themselves games. Pure virtual worlds like *Second Life, Active Worlds,* or *There* can be applied to any context, as opposed to game worlds, which generally have a fixed, goal-oriented purpose.

In the last year, interest in virtual worlds has grown considerably, fueled in no small part by the tremendous press coverage of examples like *Second Life*. Campuses and businesses have established locations in these worlds in much the same way they were creating websites a dozen years ago. In the same way that the number and sophistication of websites grew very quickly as more people began to browse the 2D Internet, virtual locations will become more common and more mature as the trend that is leading us to a 3D form of network-based interconnections continues.

Virtual worlds offer flexible spaces for learning and exploration—educational use of these spaces is already underway and growing. These spaces are used for training emergency response personnel, developing civic participation and leadership skills, visualizing real time weather data, modeling complex mathematical functions, and experimenting with architectural models, among other uses. A consortium of librarians has built an extensive and growing set of information resources in *Second Life*. Courses from English to Chemistry hold meetings in virtual worlds, making use of their flexibility and powerful building tools to stage dramas and create realistic 3D molecular models.

Recommendations for Research

- How well do lessons learned in a virtual world translate into real-world applications?
- Do immersive learning experiences engage learners? In what ways?
- Why are virtual worlds so compelling to some and not to others? What are the essential factors that make one person willing to spend hours exploring these spaces and other much less so?

Recommendations for Demonstration Projects

- Model training programs for faculty, and model curricula for using virtual worlds in courses across disciplines.
- Model projects drawn from across the curriculum that illustrate ways in which virtual worlds might be applied in learning contexts.
- Illustrations of the kinds of material or teaching practices that lend themselves to a virtual world setting.
- Projects that bring people together for idea exchange and dialog, especially those that encourage collaboration with peers and experts from around the world.
- Examples of how the social nature of virtual worlds might be applied to social learning activities.

Policy Considerations

- How can access to the technology and infrastructure required to participate be assured?
- What policy modifications are necessary to ensure that research with these environments fits into the generally accepted notion of what scholarship is?

Needed Tools or Features

- Access to technology required to run the software associated with virtual worlds (graphics capability, bandwidth, connection speeds).
- Support for accessible technologies like screen readers to interact with virtual worlds.

New Scholarship and Emerging Forms of Publication

Time-to-Adoption Horizon: Four to Five Years

Both the process and shape of scholarship are changing. Nontraditional forms are emerging that call for new ways of evaluating and disseminating work. Increasingly, scholars are beginning to employ methods unavailable to their counterparts of several years ago, including prepublication releases of their work, distribution through nontraditional channels, dynamic visualization of data and results, and new ways to conduct peer reviews using online collaboration. These new approaches present a new challenge: to protect the integrity of scholarly activity while taking advantage of the opportunity for increased creativity and collaboration.

The time-honored activities of academic research and scholarly activity have benefited from the explosion of access to research materials and the ability to collaborate at a distance. At the same time, the processes of research, review, publication, and tenure are challenged by the same trends. The proliferation of audience-generated content combined with open-access content models is changing the way we think about scholarship and publication—and the way these activities are conducted.

While significant challenges remain before the emerging forms of scholarship we are seeing are accepted, nonetheless there are considerable examples of work that is expanding the boundaries of what we have traditionally thought of as scholarship. In the coming years, as more scholars and researchers make original and worthwhile contributions to their fields using these new forms, methods for evaluating and recognizing those contributions will be developed, and we expect to see them eventually become an accepted form of academic work.

Recommendations for Research

- Has technical literacy and facility with emerging forms of publication increased among faculty?

- To what degree are audiences comfortable with and accepting of new forms of scholarship and publication?
- How is the perception of scholarship changing (or is it) among different audiences (students, faculty, other stakeholders)?

Recommendations for Demonstration Projects

- Pilot programs for peer review that take new scholarship and emerging forms of publication into account.
- Partnerships between faculty, scholars, and professional associations that advocate the use of new forms.
- Examples across the disciplines that demonstrate how these new forms are appropriate for each.
- Projects in which students take on the role of reviewers and producers, rather than the role of consumers of knowledge.
- Demonstrations of how these techniques could be applied to collaborative scholarship.

Policy Considerations

- How can administrative support be secured for the exploration of new methods and forms of scholarship and publication? The process would be greatly aided by champions willing to pioneer the process, from faculty to department heads to deans and provosts.
- What are the implications of new scholarship and emerging forms of publication on established systems of tenure and promotion?
- These practices may result in increased availability of work-in-progress and evolving or ongoing research. Are there intellectual property or related issues to consider as a result?

Needed Tools or Features

- Enterprise-level tools similar to LMSs (Blackboard, Desire2Learn) that support undergraduate research in the same way they support teaching.
- Collaboration tools—web, video, and other forms of real-time conferencing.

Massively Multiplayer Educational Games

Time-to-Adoption Horizon: Four to Five Years

Interest in educational gaming has accelerated considerably over the last few last years. Discussion and research has continued, identifying games that are goal-oriented and those that are more social in nature; games that are easy to construct and play, and those that are more complex and time-consuming; and games developed expressly for education versus commercial games that are appropriated for educational use.

The term "serious games" has been coined to describe games that have an educational purpose and non-entertainment goals. Educators are taking a hard look at one type of serious game, massively multiplayer online educational games (MMOs), and finding strong potential for teaching and learning. Like other kinds of games, educational MMOs combine a carefully crafted setting with specific educational objectives. What makes these games especially compelling and effective is their multiplayer nature—students can work in small or large groups, or can pursue goals solo, all in the context of a larger community of player-learners. Role-playing is a possible, but not essential, component. Other possible interactions include mentoring of newer players by more experienced ones, competitive team activities, and collaborative world-building.

These games are time-consuming and often expensive to produce, but practical real-life examples can easily be found, and there are many demonstration projects underway. Interest is high and developments in the open-source arena are bringing this technology closer to mainstream use year by year.

Recommendations for Research

- How do massively multiplayer games engage learners? What are the key factors to consider?
- How well do lessons learned via massively multiplayer games translate into real-world skill sets?
- Why are MMOs so compelling to some and not to others? What are the essential factors that make one person willing to spend hours exploring these spaces and others much less so?

Recommendations for Demonstration Projects

- Projects that illustrate ways that massively multiplayer educational games offer opportunities for immersive, interactive experiences that learners might not have access to otherwise.
- Practical examples of MMOs that have a solid footing within particular disciplines.
- Examples that highlight how collaboration and peer-to-peer interactions common to MMO experiences can be used to increase the impact of learning activities.
- Models that demonstrate educational uses of commercial, entertainment-based MMOs, like *World of Warcraft*, *Halo*, or *Neverwinter Nights*.

Policy Considerations

- The skill sets involved in creating high-quality, educationally-themed game experiences are uncommon. How can more institutions be encouraged to offer degree programs around such skills, much as web development skills became part of a number of disciplines in the 1990s?
- How can funding agencies be encouraged to support pilot projects and demonstration efforts in this arena?
- What policy modifications are necessary to ensure that research with these environments fits into the generally accepted notion of what scholarship is?

Needed Tools or Features

- Open-source or low-cost tools for creating educational MMOs that meet student expectations.
- A standardized file format and development environment to facilitate sharing of models and resources.

Continuing the Dialog

As noted in the opening section of this report, the recommendations presented here are intended to be a starting place for continued dialog and reflection around the six topics in the 2007 *Horizon Report*. The innovations embedded in the areas highlighted in that report have shown enough early potential to demonstrate that they are worth keeping an eye on — some like Social Networking, Cell Phones, Virtual Worlds, and MMOs have appeared in previous editions of the report as well, and we are watching their progress with interest.

In each case there is a strong consensus that these areas are worthy of additional study. This *Call to Scholarship* is a snapshot of a continuing dialog taking place around the academy that is considering their ultimate potential and documenting the work yet to be done before that potential can be understood fully.

This dialog is an important part of the process behind the Horizon Project, and we want to highlight the ways you or your institution may be examining the theoretical, practical, and policy aspects of these topics. We encourage you to let us know about work you may be doing by writing to horizon@nmc.org. The NMC will feature demonstration projects related to Horizon topics on our website.

The process that was used to generate this *Call to Scholarship* will continue to evolve over the coming years, with the intention of continuing, and capturing, the dialog that takes place around the *Horizon Report* each year. We look forward to seeing future starbursts of activity related to these and other Horizon topics.

We'd also love to see further comments and thoughts, both in ways that add to the lists of ideas, and in ways that will help us improve this process in coming years. The 2007 Horizon Project wiki remains active at horizon.nmc.org/wiki/Horizon2007.

About the NMC

The New Media Consortium (NMC) is an international 501(c)3 not-for-profit consortium of nearly 250 learning-focused organizations dedicated to the exploration and use of new media and new technologies. NMC member institutions are found in almost every state in the United States, across Canada, and in Europe, Asia and Australia. Among the membership are an elite list of the most highly regarded colleges and universities in the world, as well as a growing list of innovative museums, research centers, foundations, and forward-thinking companies.

The consortium serves as a catalyst for the development of new applications of technology to support learning and creative expression, and sponsors programs and activities designed to stimulate innovation, encourage collaboration, and recognize excellence among its member institutions. Through its many projects, its comprehensive website, and its series of international conferences, the NMC stimulates dialog and understanding through the exploration of promising ideas, technologies, and applications.

As a central part of its mission, the NMC encourages and supports innovation in the pursuit of effective collaboration, especially in the activities and projects in which it plays a leadership role. For more information on the NMC, visit its website at www.nmc.org.

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